



US009409282B2

(12) **United States Patent**
Fukui et al.

(10) **Patent No.:** **US 9,409,282 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **CLAMP APPARATUS**

(56) **References Cited**

(71) Applicant: **SMC KABUSHIKI KAISHA**,
Chiyoda-ku (JP)

U.S. PATENT DOCUMENTS

(72) Inventors: **Chiaki Fukui**, Abiko (JP); **Youji Takakuwa**, Kitakatsushika-gun (JP)

4,905,973 A 3/1990 Blatt
5,967,502 A * 10/1999 Dykstra B25B 5/122
269/228
6,279,886 B1 8/2001 Grossart

(73) Assignee: **SMC KABUSHIKI KAISHA**,
Chiyoda-ku (JP)

(Continued)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

FOREIGN PATENT DOCUMENTS
CN 1325781 A 12/2001
DE 10057345 A1 5/2001

(Continued)

(21) Appl. No.: **14/403,728**

OTHER PUBLICATIONS

(22) PCT Filed: **Jun. 17, 2013**

Combined Office Action and Search Report issued on Jul. 21, 2015 in Chinese Patent Application No. 201380036755.0 with English translation.

(86) PCT No.: **PCT/JP2013/067151**

§ 371 (c)(1),
(2) Date: **Nov. 25, 2014**

(Continued)

(87) PCT Pub. No.: **WO2014/010390**

PCT Pub. Date: **Jan. 16, 2014**

Primary Examiner — Monica Carter

Assistant Examiner — Nirvana Deonauth

(74) *Attorney, Agent, or Firm* — Oblon, McClelland, Maier & Neustadt, L.L.P.

(65) **Prior Publication Data**

US 2015/0145195 A1 May 28, 2015

(30) **Foreign Application Priority Data**

Jul. 11, 2012 (JP) 2012-155327

(57) **ABSTRACT**

(51) **Int. Cl.**

B23Q 3/08 (2006.01)

B25B 5/12 (2006.01)

B25B 5/16 (2006.01)

A clamp apparatus is equipped with a body, and a drive unit having a piston displaced under the supply of a pressure fluid. A clamp arm is disposed rotatably on the body. In addition, a piston rod of the drive unit is connected detachably with respect to a displaceable body of a driving force transmission mechanism which is disposed in the interior of the body. Upon detachment of a connector of the piston rod from a connecting recess of the displaceable body, the state of connection between the drive unit and the driving force transmission mechanism is released.

(52) **U.S. Cl.**

CPC .. **B25B 5/122** (2013.01); **B25B 5/16** (2013.01)

(58) **Field of Classification Search**

CPC B25B 5/122; B25B 5/16

See application file for complete search history.

10 Claims, 10 Drawing Sheets

